

Trout Research Makes a Splash!

A tiny chip, slipped just beneath the skin of your dog or cat, serves as a reliable identifier if your pet should stray. Staffers at veterinary offices or animal rescue centers can use the information embedded in the chip to help get your pet back to you.

But who would outfit a rainbow trout with its own silicon-chip identifier?

Scientists do.

In fact, giving a silvery trout its own high-tech name tag is a routine procedure at the ARS aquaculture research laboratories described in articles beginning on page 4.

Our geneticists are studying these experimental fish to learn more about the information locked inside trout genes. These genes, for example, may contain the sequence, or code, that enables certain trout to pack on proportionately more muscle (the tender flesh that we eat) faster than other trout. The little chips allow scientists to accurately identify who's who among a tankful of lively trout. That way, the researchers can more easily track inheritance of this or other prized traits. Stable inheritance of valuable traits is essential to breeding superior trout for tomorrow.

Other genetics research with trout may open a new market for growers of oats, barley, and perhaps other grains. Here's how: We're determining whether selected trout have a gene-derived ability to grow as quickly on grain-based feeds as they do on conventional feeds made with ocean fish.

Our pursuit of this trait is somewhat like trying to make a vegetarian out of a carnivore. Why attempt that? Because shifting to grain-based feed should cut production costs and ensure that we don't inadvertently overfish the world's oceans.

The secret to other valuable traits also lies within trout genes. That's why we're intent on deciphering the structure and function of all the genes in rainbow trout—what's known as the trout genome. Information about the structure of a length of trout genetic material—DNA—can be compared to sequences discovered in stretches of other species' DNA. Our scientists, and investigators from around the world, share such sequences by posting them on computerized, publicly accessible genome databases.

Once fish geneticists find a structure that matches that from a trout, it's possible that the genes' functions may also match. That's true even among forms of life as different as a turnip and a trout. Using genome databases to zero in on such similarities speeds and simplifies the task of pinpointing the precise role of each trout gene.

The ability to probe the genes of organisms throughout nature is an outgrowth of DNA discoveries made 50 years ago this

year by James Watson and Francis Crick.

Our modern-day sleuthing of rainbow trout genes should be invaluable in solving production problems inherent in raising not only this fish, but also its salmonid relatives—brown trout, brook trout, Pacific salmon, and Atlantic salmon. The work, for instance, should be helpful in the new Atlantic salmon research that we will begin in Maine at what will become the ARS National Cold Water Marine Aquaculture Research Center.

In all, our gene-based studies should help America's fish farmers cut production costs, remain good environmental stewards, and meet the growing demand for fresh fish.

Excellent suggestions and recommendations for the salmon and trout studies—and for our other aquaculture investigations—were provided by fish ranchers, researchers, and others who participated in a Joint National Aquaculture Program Planning Workshop, held in 2002 in St. Louis, Missouri. We'll use these ideas to update our National Program. We've posted highlights of the workshop on the World Wide Web at www.nps.ars.usda.gov. Once you're on the web site, click on "Aquaculture (#106)," then click on "National Program Planning Workshop."

This fall, as co-hosts of the United States Trout Farmers Association 2003 Annual Meeting, we'll have a new opportunity to make sure we're tackling growers' most troublesome problems.

Next year, we'll get additional ideas and feedback from colleagues convened as part of our agency's new scientific quality review system. (See "Forum," *Agricultural Research*, May 2002, p. 2.) This in-depth assessment will cover all aspects of our aquaculture program.

Trout and salmon are good for you. They are high in protein and rich in healthful omega-3 fatty acids. Our research will help guarantee that these and other farm-raised fish remain plentiful and affordable for you to enjoy.

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